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PATENT

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Atty Docket No.: 200315473-1

App. Ser. No.: 10/697,974

an electrostatic potential delivery device for delivering electrostatic potential to the support plate, wherein delivery of electrostatic potential to the support plate operates to vary the velocities at which the droplets impact the substrate.

2. (Currently amended) The system according to claim ~~[[1]]~~3, wherein said arcuate section is configured to substantially prevent drying of the material in the nozzle.

3. (Currently amended) The system according to claim 1, the jetting assembly further comprising:

a reservoir containing the material, said reservoir having a nozzle through which the material is expelled from the reservoir;

an arcuate section positioned between the reservoir and the nozzle, wherein the material is configured to travel from the reservoir, through the arcuate section, and through the nozzle;

means for applying pressure on the material contained in the reservoir, wherein the material is expelled from the reservoir through application of pressure by the means for applying pressure to thereby create a column of the material from the nozzle; and

means for producing pressure modulations located proximate the nozzle, the means for producing pressure modulations being configured to substantially regulate formation of droplets from the column of the material-a support plate configured to support one or both of the substrate and the jetting assembly.

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4. (Currently amended) The system according to claim ~~[[3]]~~<sup>1</sup>, wherein said support plate is configured to move in two or more dimensions to thereby move the substrate.

5. (Canceled).

6. (Currently amended) The system according to claim ~~[[1]]~~<sup>3</sup>, further comprising:  
a collection plate positioned between the one or more deflection plates and the substrate, said collection plate being configured to receive unwanted droplets, and wherein said collection plate is configured to direct received droplets to at least one of a waste area and the reservoir.

7. (Original) The system according to claim 6, wherein the one or more deflection plates are configured to alter the trajectories of unwanted droplets into the collection plate.

8. (Original) The system according to claim 1, wherein the one or more deflection plates are configured to alter the trajectories of the droplets to various sections of the substrate.

9. (Currently amended) The system according to claim ~~[[1]]~~<sup>3</sup>, further comprising:  
a heating mechanism configured to supply heat to the material contained in the reservoir.

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10. (Original) The system according to claim 1, wherein the material comprises one or more of a semiconductor material, a metal, a dielectric, a passivation material, a protective coating material, an etchant, a dopant, and a reactant.

11. (Currently amended) The system according to claim [[1]]3, wherein the reservoir comprises a re-filling device configured to enable material to be inserted into the reservoir.

12. (Currently amended) The system according to claim [[1]]3, wherein the reservoir comprises a separate component and wherein the reservoir is separately replaceable.

13. (Currently amended) The system according to claim [[1]]3, further comprising:  
a controller for controlling the means for applying pressure, the means for producing pressure modulations, the charging ring and the deflection plates;

14. (Currently amended) The system according to claim [[1]]3, wherein the means for producing pressure modulations comprises a PZT transducer.

15. (Currently amended) The system according to claim [[1]]3, further comprising:  
a plurality of jetting assemblies;  
a plurality of charging rings, wherein droplets from the plurality of jetting assemblies are configured to pass through respective ones of the plurality of charging rings; and  
a plurality of deflection plates for altering the trajectories of the droplets from respective ones of the jetting assemblies.

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16. (Original) The system according to claim 15, wherein the plurality of jetting assemblies contain different materials with respect to each other.

17. (Original) The system according to claim 15, wherein the plurality of jetting assemblies are positioned to substantially simultaneously deposit material onto the substrate.

18. (Currently amended) A method for depositing a material onto a substrate, said method comprising:

applying a pressure onto a material located in a reservoir, wherein said pressure causes the material to flow through a oruate section and out of a nozzle in a fluid column;

creating pressure modulation through the fluid column to control formation of droplets from the fluid column, wherein the droplets travel along a flight path from the fluid column;

electrically charging one or more of the droplets; [[and]]

depositing the one or more droplets onto the substrate;

determining whether a velocity at which the one or more droplets are deposited onto the substrate is to be altered prior to the step of depositing the one or more droplets onto the substrate; and

altering the velocities of the one or more droplets in response to a determination that the velocities at which the one or more droplets are deposited onto the substrate are to be altered-varying the flight path of at least one of the one or more charged droplets.

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19. (Currently amended) The method according to claim ~~[[18]]~~26, wherein the step of varying the flight path of at least one of the one or more charged droplets comprises inducing an electrostatic potential on the at least one of the one or more charged droplets to vary the flight path.

20. (Currently amended) The method according to claim ~~[[18]]~~26, further comprising:

determining whether at least one of the one or more charged droplets are to be discarded; and

wherein the step of varying the flight path of at least one of the one or more charged droplets comprises varying the flight path of one or more charged droplets to be discarded to direct the one or more charged droplets to be discarded to a collection plate.

21. (Currently amended) The method according to claim ~~[[18]]~~26, wherein the step of varying the flight path of at least one of the one or more charged droplets comprises varying the flight path of at least one of the one or more charged droplets having a charge/mass ratio falling outside of a predetermined charge/mass ratio range.

22. (Original) The method according to claim 18, further comprising:  
determining one or more positions on the substrate for the one or more droplets to impact; and

directing at least one of the one or more droplets to impact the one or more positions on the substrate.

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23. (Currently amended) The method according to claim ~~[[18]]~~22, further comprising:

determining whether a trajectory of the at least one of the one or more droplets is to be altered; and

wherein the step of directing the at least one of the one or more droplets to impact the one or more positions comprises varying the trajectory of the at least one of the one or more droplets to vary the position of impact of the at least one of the one or more droplets on the substrate.

24. (Original) The method according to claim 18, further comprising:

determining one or more positions on the substrate for the one or more droplets to impact;

determining whether the substrate is to be moved to cause the one or more droplets to impact the one or more positions; and

moving the substrate in response to a determination that the substrate is to be moved to cause the one or more droplets to impact the one or more positions.

25. (Original) The method according to claim 18, further comprising:

determining one or more positions on the substrate for the one or more droplets to impact;

determining whether a trajectory of the at least one of the one or more droplets is to be altered and whether the substrate is to be moved to cause the one or more droplets to impact the one or more positions; and

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altering the trajectory of the at least one of the one or more droplets and moving the substrate to cause the one or more droplets to impact the one or more positions.

26. (Currently amended) The method according to claim 18, further comprising:

~~varying the flight path of at least one of the one or more charged droplets depositing the one or more droplets onto the substrate;~~

~~determining whether a velocity at which the one or more droplets are deposited onto the substrate is to be altered prior to the step of depositing the one or more droplets onto the substrate; and~~

~~altering the velocities of the one or more droplets in response to a determination that the velocities at which the one or more droplets are deposited onto the substrate are to be altered.~~

27. (Currently amended) The method according to claim ~~[[26]]~~18, further comprising:

applying an electrostatic charge having the same polarity as the electrical charge of the one or more droplets to decrease the velocities of the one or more droplets; and

applying an electrostatic charge having a different polarity than the electrical charge of the one or more droplets to increase the velocities of the one or more droplets.

28. (Original) The method according to claim 18, wherein the step of creating pressure modulations through the fluid column comprises creating acoustic waves with a PZT transducer.

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29. (Original) The method according to claim 18, wherein the step of applying a pressure onto a material comprises applying a substantially uniform pressure onto the material.

30. (Original) The method according to claim 18, further comprising:  
re-filling the reservoir with one or more of the material and a different material.

31. (Original) The method according to claim 18, further comprising:  
replacing the reservoir with one or more of a reservoir containing the material and a reservoir containing a different material.

32. (Currently amended) A system for delivering material onto a substrate, said system comprising:  
means for housing the material;  
means for applying pressure on the material;  
means for expelling the material from the means for housing the material;  
means for channeling the material from the means for housing to the means for expelling the material, ~~wherein the means for channeling the material comprises an arcuate~~  
shape;  
means for creating substantially uniform droplets from a column of material expelled from the means for expelling the material; [[and]]  
means for selectively charging the droplets;  
means for moving the substrate in at least one dimensional plane; and



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means for applying an electrostatic charge to the means for moving to vary the velocity of the charged droplets approaching the substrate.

33. (Original) The system according to claim 32, wherein the means for creating substantially uniform droplets comprises means for producing pressure modulations in the column of material.

34. (Original) The system according to claim 32, further comprising:  
means for heating the material housed in the means for housing.

35. (Original) The system according to claim 32, further comprising:  
means for deflecting one or more of the charged droplets.

Claims 36 and 37. (Canceled).

38. (Original) The system according to claim 32, further comprising:  
means for re-filling the reservoir with one or more of the material and a different material.

39. (Currently amended) A computer readable storage medium on which is embedded one or more computer programs, said one or more computer programs implementing a method for depositing a material onto a substrate, said one or more computer programs comprising a set of instructions for:

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applying a pressure onto a material located in a reservoir, wherein said pressure causes the material to flow ~~through an arcuate section and~~ out of a nozzle in a fluid column;

creating pressure modulation through the fluid column to control formation of droplets from the fluid column, wherein the droplets travel along a flight path from the fluid column;

electrically charging one or more of the droplets; ~~[[and]]~~

depositing the one or more droplets onto the substrate;

determining whether a velocity at which the one or more droplets are deposited onto the substrate is to be altered prior to the step of depositing the one or more droplets onto the substrate; and

altering the velocities of the one or more droplets in response to a determination that the velocities at which the one or more droplets are deposited onto the substrate are to be altered ~~varying the flight path of at least one or more charged droplets.~~

40. (Currently amended) The computer readable storage medium according to claim ~~[[39]]~~45, said one or more computer programs further comprising a set of instructions for:

determining whether at least one of the one or more charged droplets are to be discarded; and

wherein the step of varying the flight path of at least one of the one or more charged droplets comprises varying the flight path of one or more charged droplets to be discarded to direct the one or more charged droplets to be discarded to a collection plate.

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41. (Original) The computer readable storage medium according to claim 39, said one or more computer programs further comprising a set of instructions for:

determining one or more positions on the substrate for the one or more droplets to impact; and

directing at least one of the one or more droplets to impact the one or more positions on the substrate.

42. (Currently amended) The computer readable storage medium according to claim ~~[[39]]~~41, said one or more computer programs further comprising a set of instructions for:

determining whether a trajectory of the at least one of the one or more droplets is to be altered; and

wherein the step of directing the at least one of the one or more droplets to impact the one or more positions comprises varying the trajectory of the at least one of the one or more droplets to vary the position of the at least one droplet on the substrate.

43. (Original) The computer readable storage medium according to claim 39, said one or more computer programs further comprising a set of instructions for:

determining one or more positions on the substrate for the one or more droplets to impact;

determining whether the substrate is to be moved to cause the one or more droplets to impact the one or more positions; and

moving the substrate in response to a determination that the substrate is to be moved to cause the one or more droplets to impact the one or more positions.

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44. (Original) The computer readable storage medium according to claim 39, said one or more computer programs further comprising a set of instructions for:

determining one or more positions on the substrate for the one or more droplets to impact;

determining whether a trajectory of the at least one of the one or more droplets is to be altered and whether the substrate is to be moved to cause the one or more droplets to impact the one or more positions; and

altering the trajectory of the at least one of the one or more droplets and moving the substrate to cause the one or more droplets to impact the one or more positions.

45. (Currently amended) The computer readable storage medium according to claim 39, said one or more computer programs further comprising a set of instructions for:

varying the flight path of at least one of the one or more charged droplets-depositing the one or more droplets onto the substrate;

~~determining whether a velocity at which the one or more droplets are deposited onto the substrate is to be altered prior to the step of depositing the one or more droplets onto the substrate; and~~

~~altering the velocities of the one or more droplets in response to a determination that the velocities at which the one or more droplets are deposited onto the substrate are to be altered.~~

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46. (Currently amended) The computer readable storage medium according to claim ~~[[45]]~~39, said one or more computer programs further comprising a set of instructions for:

applying an electrostatic charge having the same polarity as the electrical charge of the one or more droplets to decrease the velocities of the one or more droplets; and

applying an electrostatic charge having a different polarity than the electrical charge of the one or more droplets to increase the velocities of the one or more droplets.